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ABSTRACT

Self-concept ideas can be reformulated and integrated into an objectives oriented model of school learning. Bloom's model (1976) involving mastery learning already incorporates self-concept elements, but needs to be developed theoretically to include norm-referenced as well as criterion-referenced approaches to assessing self-concepts. This involves reconceptualizing self-concepts in perceived self-efficacy, a notion derived from Bandura's (1977) social learning theory. Following a discussion of ways in which Bloom's model can be expanded, a single case study of an adolescent with specific learning disabilities is presented to illustrate the ideas and methods developed in the paper. The study was designed to investigate (1) whether self-efficacy judgments in relation to a basic skill can be altered prior to task performance by modelling correct performance or examining the basis of self-efficacy judgments; (2) whether self-efficacy judgments can predict subsequent performance accuracy; and (3) whether changes in self-efficacy judgments in relation to a basic task are associated with changes in self-efficacy jugdments in relation to an application of the basic skill. Evidence from the study indicates that in some conditions self-efficacy change could influence achievement and that perceived competence factors are involved in determining achievement levels. (LC)

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# The assessment of self concepts of educational achievement by a criterion referenced approach

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Although the title of my paper refers to assessment I am assuming that assessment takes place within a theoretical framework, and will therefore also talk about self concept theories in relation to educational achievement. This might appear out of place in this symposium but I hope to show that self concept ideas can be reformulated and integrated into an objectives orientated model of school learning. Bloom's model (1976) involving mastery learning already incorporates self concept elements but needs to be developed theoretically to include not only norm referenced but also criterion referenced approaches to assessing self concepts. I will argue that this involves reconceptualising self concepts in terms of perceived self efficacy, a notion derived from Bandura's social learning theory (1977). I will end the paper by illustrating the ideas and methods in a single case study of an adolescent with specific learning difficulties.

The attainment of self confidence, self esteem or positive self concepts is widely advocated as an important educational aim. However, disagreement sets in when more specific questions are asked about the value of devoting curriculum time to these aims. Proponents of a skill development model view positive self concepts as an outcome of other educational attainments, and therefore believe that curricular activities ought to be directed at developing cognitive goals. By contrast, proponents of a self enhancement model assume that positive self concepts are a determinant of cognitive attainments, and that specific activities ought therefore to be directed to enhancing self concepts partly as a means of enhancing other achievements. I am arguing that despite the significance of investigating the relationship between self concept and educational achievement, researchers have not adopted relevant designs. Bloom (1976) has noted this, but has not provided suggestions for overcoming the difficulty. At this stage, I will outline some aspects of Bloom's model and then discuss ways in which it can be developed. Central to the approach is a focus on the conditions influencing learning outcomes and therefore on individual differences in learning,

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and not stable general differences between learners. The approach can be characterised as behavioural in that assessment is in terms of curricular objectives and not in terms of global ability and personality constructs. A crucial part of the teaching-learning process is the use of diagnostic progress assessment and the use of feedback and corrective procedures to enable children to achieve mastery level. It is clear that Bloom's model incorporates both the skill development and self enhancement models referred to before. However, academic self concepts are only one aspect of what are termed affective entry characteristics - a complex compound of interests, attitudes and self perceptions. Much of the research relating to the infuence of affective entry characteristics involves subject and school related effect. Bloom claims that these aspects may be separable from academic self concepts in the early years of school, but become increasingly interrelated with age, and that for practical purposes academic self concepts can be used as an index of affective entry characteristics.

There are certain aspects of the methodology used in investigating the relationship between achievement and academic self concepts which require attention. The few studies investigating the causal relationship are at a macro level where strict implementation of the intervention procedures is often difficult. Secondly, even when studies use relatively well constructed measures of molecular self constructs, the influence of the traditional individual difference and trait assumptions about self concepts are evident. An implication of Shavelson's self concept hierarchy, Shavelson et al (1980), an idea consistent with Bloom's model, is that assessment can go down to the base of the hierarchy, yet in practice it goes down only to subject based self concepts. These medium level self concepts are considered to be relatively stable with the effect that intervention studies need to take place over at least 6 months. A third point concerns the exclusive use of norm referenced measures. The widely used Brookover self concept of ability measure - involves items such as - "how do you rate yourself in school ability compared with your friends?" Although not all items refer so explicitly to social comparison as a basis for self concept, raw scores are interpreted in relation to group norms. This assessment orientation corresponds to and is appropriate for the norm referenced assessment of cognitive achievement in most studies. However, in terms of the underlying framework of mastery learning with its

emphasis on instructional objectives and its ideology that equality of learning outcome can be an educational goal, one would expect that academic self concepts would be assessed in relation to such objectives. In terms of Shavelson's model there is a place for the assessment of self concepts of ability at the base of the hierarchy in relation to specific educational objectives. The importance of assessment at this micro level is that self concepts are likely to be relatively open to environmental influence. Focusing research at this level could open up another way of investigating the causal relationsip between self concepts and achievement.

My aim in this paper is to make links between this expanded version of Bloom's model and Bandura's theory of self efficacy. Part of Bandura's (1977) social learning theory involves the view that perceived self efficacy affects behavioural functioning by influencing the choice of activity, effort expenditure and persistence in the face of difficlties. The higher the perceived self efficacy the greater is the sustained involvement in activities and therefore subsequent achievement. Because self efficacy is considered to have motivational effects it is relevant to children's achievement behaviour. And, as it is concerned with a judgement of one's ability to produce a given pattern or kind of behaviour, it is one way of conceptualising self concepts of ability. Bandura's studies involving the notion of self efficacy were designed to investigate the processes involved in altering phobic behaviour. These studies have indicated that self efficacy is enhanced by information conveyed through such different treatment modalities as actual performance, modeling and systematic desensitisation. Perceived self efficacy was also found to predict the level of behaviour change resulting from different treatments. Bandura's work is relevant in that it provides a model for investigating the causal relationship between self concepts of ability and educational achievement at a micro level of analysis, and in particular a procedure for assessing self concepts by a criterion referenced approach in terms of efficacy judgements in relation to educational objectives.

I have applied these ideas and procedures in a pilot single case study of a 14 year old boy, Gary, who was referred to the local school psychological services for specific learning difficulties with spelling and arithmetic computations. I will give a brief description of the rationale for the study, the procedures used

to monitor and influence change in self efficacy judgements and corresponding arithmetic performance and will then discuss the results and implications. From a cognitive social learning theory perspective, self efficacy judgements are influenced by feedback about previous performances. Accuracy in self efficacy judgements could be increased therefore by appropriate feedback to the person. This could be done by discussing with the person the comparison of pre-performance self efficacy judgements and the subsequent performance level in terms of over or under-estimation. From this theoretical perspective self efficacy judgements will also determine subsequent performance levels through their influence on personal effort and persistence. Performance accuracy could be increased therefore by raising self efficacy judgements. This could be achieved by modelling correct performance and/or examining the initial self efficacy judgements with the person concerned.

The pilot study was designed therefore to investigate 1. whether self efficacy judgements in relation to a basic skill could be altered prior to task performance by modelling correct performance and/or examining in discussion the basis of self efficacy judgements, 2. whether self efficacy judgements could predict to some degree subsequent performance accuracy, and 3. whether changes in self efficacy judgements in relation to a basic task are associated with changes in self efficacy judgements in relation to an application of the basic skill. The study involved four stages: baseline, intervention 1, intervention 2 and maintenance-generalisation.

Fig. 1 DESIGN OF STUDY

Stage 1: Baseline (4 weeks for basic and application objectives)

1. self efficacy probes
2. performance probes
3. feedback on match between 1 and 2
4. correction of performance

Stage 2: Intervention 1 (4 weeks)

1. self efficacy probes
2. intervention (for basic objective only)- model correct solution
3. self efficacy probes
4. performance probes

5. feedback on match between 3 and 4
6. correction of performance

Stage 3: Intervention 2 (4 weeks)

1. self efficacy probes
2. intervention for (basic objective only)- model correct solution and discussion
3. self efficacy probes
4. performance probes
5. feedback on match between 3 and 4
6. correction of performance

Stage 4: Maintenance and generalisation (12 weeks later, for 4 weeks)

1. self efficacy probes
2. performance probes
3. feedback on match between 1 and 2
4. correction of performance

In the baseline period self efficacy and performance levels were assessed. Feedback about over or under estimation on the basis of comparing self efficacy and performance levels was then given. Finally, any necessary corrections to his performance were made. In the second and third stages -interventions 1 and 2 - attempts were made to alter self efficacy judgements prior to task performance. In the second stage a correct strategy on the basic task only was modelled using 3 items and then change in self efficacy judgements assessed. Performance on the task was then assessed followed by the same feedback and correction procedures. The third stage was similar to the previous stage except that in attempting to alter self efficacy judgements prior to task performance, not only was a correct strategy for the basic task shown but the self efficacy judgement was discussed. This focused on the basis of the judgement and its realism. In the final stage, 3 months after stage 3, the procedure returned to that of stage 1 in order to assess maintenance of performance. To assess generalisation, the same procedure was also applied to a similar task. Gary worked on tasks which were selected using an objectives based approach. This involved defining a sequence of arithmetic objectives in performance terms, Ainscow and Tweddle (1979). For each objective there was a parallel application objective which involved applying the arithmetic skill

to a practical problem. Gary was assessed on 3 sequences of objectives, involving addition, subtraction and multiplication, once a week for 3 successive weeks in order to find his current levels of functioning. As he reached criterion on all the addition objectives, it was decided to concentrate on several objectives in the subtraction and multiplication area, including one involving double digit subtraction requiring borrowing from the tens column. This objective was assessed by 5 item parallel form tests, generated from a list of random numbers - items were of the form 56-38 presented in vertical columns, with the mastery criterion set at 5 out of 5. Parallel forms of the test of the application objective were similarly constructed- items were of the form "what is 36 pence from 82 pence?". For the generalisation stage of the project 3 digit subtraction requiring borrowing in 2 columns was assessed. Five item tests for both the basic task and application objectives were constructed.

Self efficacy judgements were assessed using a scale ranging from 0 to 10. Practice was given on the scale to ensure that he understood what was required. He was then shown the items in the test for about 3 seconds, sufficient to indicate what the task involved, but too short to attempt any solutions. He was asked "Can you answer questions like this correctly?" If he answered "No" then there was no further questioning, but if he answered "Yes", then he was asked "How certain are you that you can answer these questions? Choose a number along the scale - 0 means you cannot do them and 10 that you are completely certain." The same procedure was repeated for the application objectives. The results of this assessment were used as indices of the strength of self efficacy judgement.

Gary was seen for 45 minute sessions each week. The basic aims of the sessions were for him 1. to reach criterion on the pair of objectives and 2. to encourage accurate self efficacy judgements in relation to the basic objective and use improvements in efficacy judgements to encourage higher self efficacy judgements in the application objective and more widely.

Figure 2 shows the changing efficacy and performance levels on the basic and application tasks. The dotted lines represent self efficacy judgements, the continuous lines represent the performance levels. The intervention in stage 2 aimed to influence efficacy judgements on the basic task. This was associated

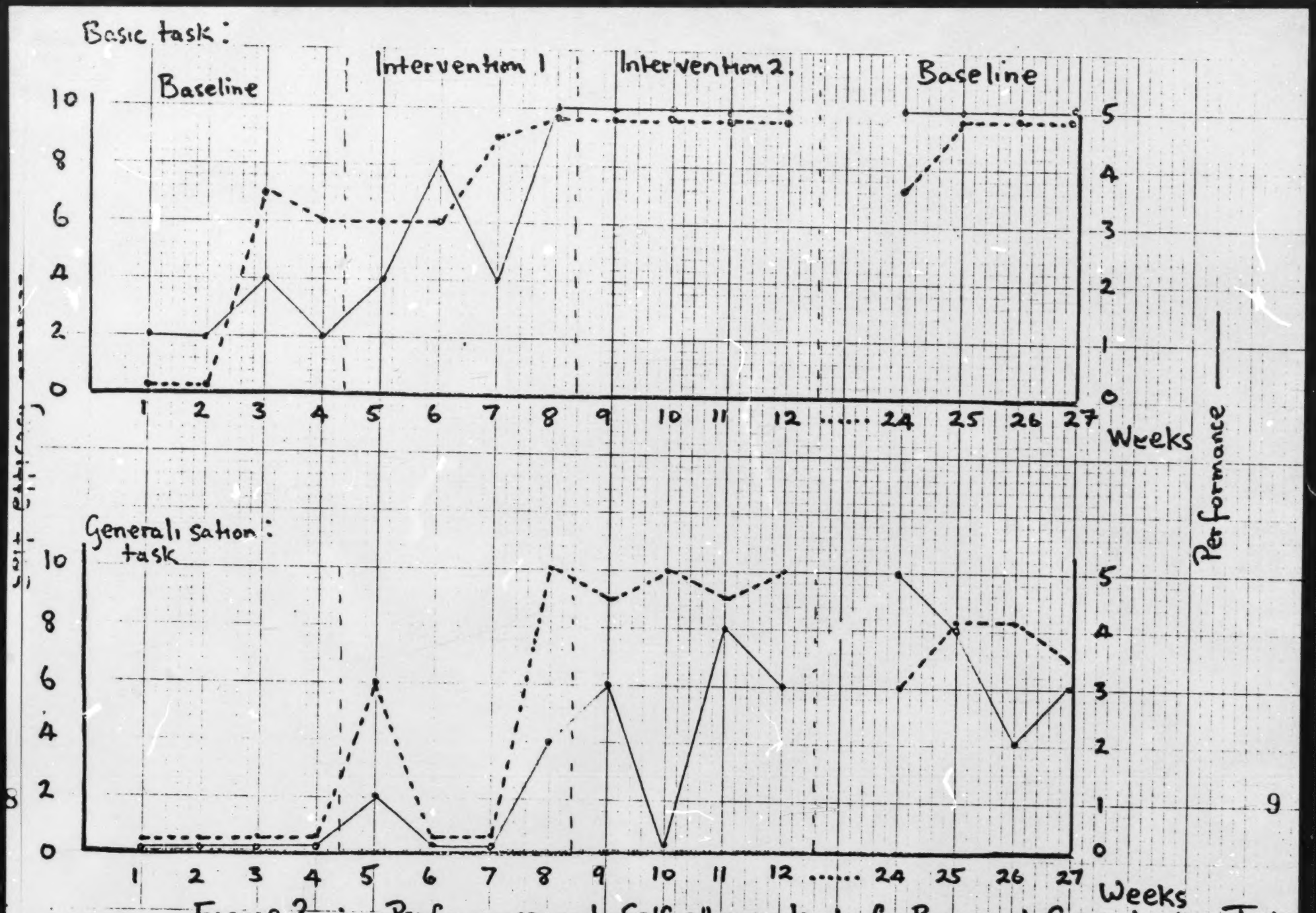



Figure 2: Performance and Self-efficacy levels for Basic and Generalisation Tasks

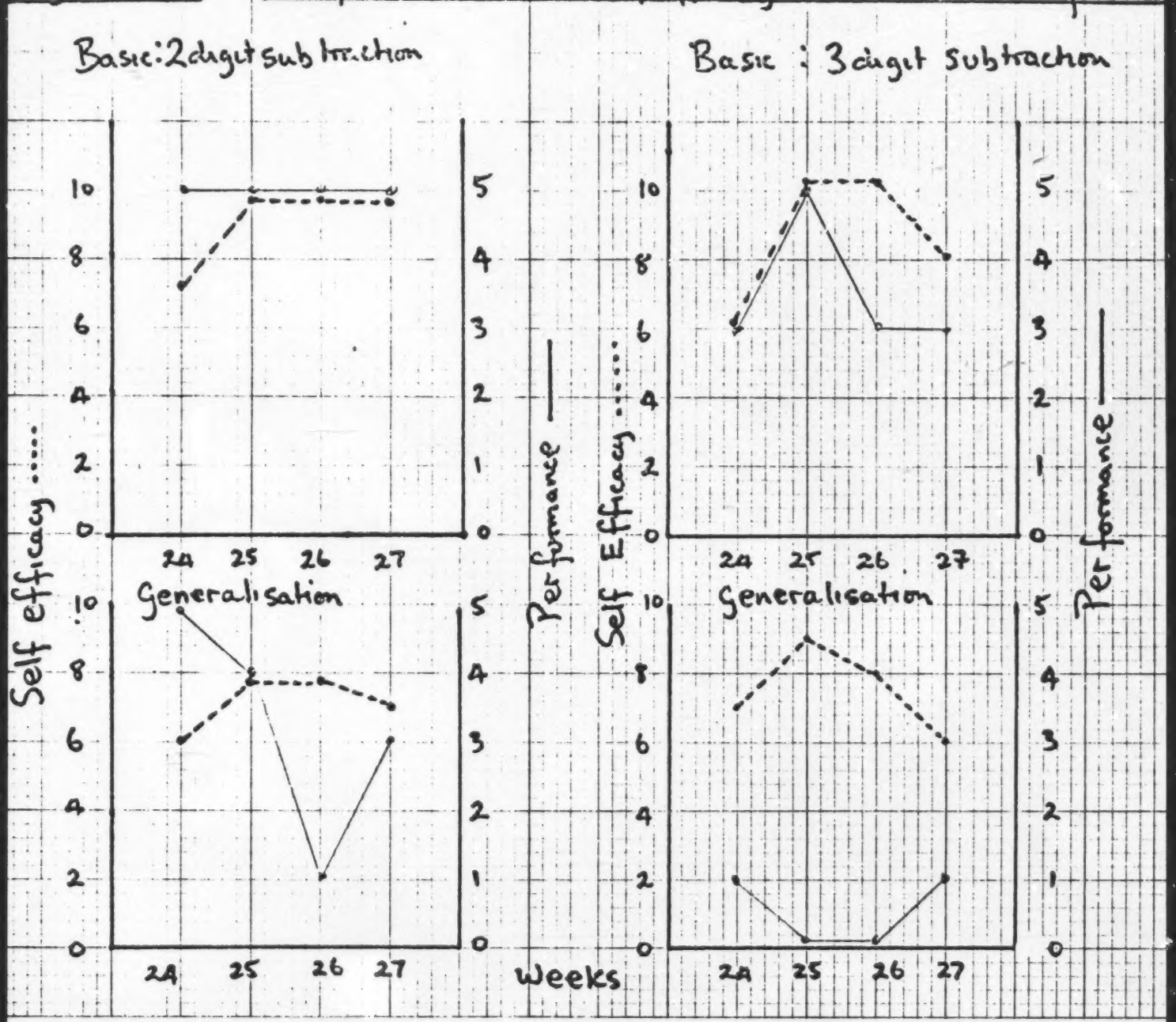
with 3 out of 4 possible changes in efficacy judgement. These changes were associated with only 1 out of 4 changes in the efficacy judgement on the application task in stage 2. It will be recalled that the modelling was on the basic task with view to assessing any transfer effect to self efficacy in relation to the application task. As this single change involved a 1 point increase in self efficacy on both tasks at week 8 it is possible that this is an instance of a general increase in self efficacy following the procedures on one task.

It was not possible on account of the project design to compare the changes in self efficacy prior to performance to a baseline change when no modelling took place. It was intended however to compare the changes in self efficacy in the modelling stage with the modelling plus discussion stage. However by the 8th week Gary was reaching criterion performance on the basic task at the time stage 3 started. This prevented any comparison of the 2 procedures for altering initial self efficacy judgements. Nevertheless, the results suggest that modelling a correct strategy prior to task performance can be associated with self efficacy change.

By comparing the self efficacy changes for the basic and application tasks in relation to performance changes, it is possible to determine whether there are associated changes in the parallel measures of self efficacy. While self efficacy and performance levels seem to increase in parallel for the basic task, this is less so with the application task. This is apparent in the self efficacy judgements reaching almost certainty level by week 10 for the application task, while the performance level is still rising to criterion level, with the exception of week 10. However, it is apparent that the almost certain self efficacy judgements on the application task parallel the same self efficacy level on the basic task. This suggests that there could have been a transfer effect from the high self efficacy and performance levels on the basic task to self efficacy on the application task. Another indication of the generalisation in efficacy judgement was the increase by the 10th week in his statements of generalised efficacy - for instance "if you think you can do something, you can do it", "if you think you can do something there is no reason to say you cannot".

Figure 3 shows the self efficacy and performance levels for the 2 digit basic and application tasks after 3 months. On the basic task Gary maintained his

Figure 3 : Performance and Self efficacy levels in Baseline period



criterion level performance and after the first session regained his certain level of self efficacy. However, on the application task, while reaching criterion level for the first time at the first retesting at week 24 his performance level decreased to his previous medium level. This can be accounted for in terms of the kind of errors he made up to week 24 compared to those made after week 24. As his performance increased to criterion he made errors of copying the figures incorrectly, not knowing which figure to take from which other figure and not using the vertical column method of rewriting the subtraction. Once he reached criterion his errors were mainly errors in subtracting single digits once he had reformulated the question. By contrast, his self efficacy level decreased to a level which reflected more accurately his performance accuracy.

Not only did Gary maintain his skills over the 3 months period for the basic 2 digit task, he also generalised it to some extent to 3 digit subtraction of the same type. Changes in his self efficacy judgements on this basic task paralleled changes in his performance accuracy. However his performance accuracy on the application of the 3 digit task was at a low level by comparison with the corresponding self efficacy judgement. Analysis of the errors over the 4 week period showed that he was applying an effective strategy but made simple 1 digit subtraction errors of the type 14 - 8 = 7. His high self efficacy level could be a reflection of his generalised certain self efficacy on the other 3 tasks.

The third aim of the project was to investigate the hypothesis that self efficacy judgements could predict to some degree subsequent performance accuracy. This micro level study is an example of how evidence relevant to the causal relationship between self efficacy and performance using time series regression analysis can be conducted. Such a statistical analysis was applied to the prediction of achievement levels on the basic and application tasks from preceding self efficacy levels. The regression coefficients for the series to week 12 were $b = 0.82$ and $b = 0.25$ respectively, both significant at the $p < .01$ level. This indicates that performances on both tasks could be predicted from preceding self efficacy levels, at a level better than chance. Recent studies by Schunk (1980) in the U.S.A. have also applied a self efficacy analysis to children's educational achievement. One of his findings using a

group experimental design was that the more problems children judged they could solve, the more they subsequently solved.

In proposing this approach as one way of investigating the relationship between self efficacy and achievement, important issues in assessing a molecular construct should not be overlooked. Kazdin (1979) has pointed out that although the self efficacy assessment procedure has face validity, it is still necessary to isolate self efficacy as a specific construct by appropriate validation methods. It is also important to find out whether undergoing self efficacy assessment prior to a behavioural test may itself influence subsequent behaviour. Work by Gauthier and Ladouceur (1980) and Weinberg and others (1980) suggests that the public expression of self efficacy had no performance effects compared to privately expressed statements.

In conclusion, I want to refer to the view advocated by Sheirer and Kraut, (1979), that it is unlikely that educational achievement can be increased by self concept change as self concept is an outcome and not a causal variable. I have argued in this paper for a model which treats self concept factors as both causal and outcome factors. I have also argued for a reformulation of self concept constructs so that the scope for research and the application of principles to teaching can be extended. Evidence has been presented which indicates that in some conditions self efficacy change could influence achievement and that perceived competence factors, whether conceptualised in terms of self concept or self efficacy are involved in determining achievement levels. The theoretical position taken here does not imply that symbolic or verbal procedures to alter perceived self efficacy are the only or necessarily the most effective for enhancing self efficacy. The position assumes that self efficacy changes can be induced by a variety of procedures, such as, performance accomplishments, vicarious experience or direct verbal/counselling procedures and that more than one can be tried in a teaching approach. From this cognitive social learning theory perspective it is possible to reconcile theory which implicates cognitive processes in regulating achievement with the practice of influencing self efficacy through the direct experience of mastery, as one amongst several methods.

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